

What is claimed is:

- 1 (1.) A rotor of a synchronous machine, comprising:
2 an iron core segment per pole; and
3 at least two permanent magnets per pole.
- 1 (2.) A rotor, as set forth in claim 1, wherein said rotor has a plurality of poles.
- 1 3. A rotor, as set forth in claim 1, wherein said permanent magnets have rectangular shapes.
- 1 4. A rotor, as set forth in claim 1, wherein said permanent magnets are tangentially
2 magnetized.
- 1 5. A rotor of a synchronous machine, comprising:
2 two iron core segments with additional pole piece per pole; and
3 one permanent magnet per pole.
- 1 6. A rotor, as set forth in claim 5, wherein said rotor has a plurality of poles.
- 1 7. A rotor, as set forth in claim 5, wherein said permanent magnets have trapezoidal shapes.
- 1 8. A rotor, as set forth in claim 5, wherein said permanent magnets are tangentially
2 magnetized.
- 1 9. A synchronous machine with a rotor comprising:
2 one or more iron core segments per pole;
3 one or more permanent magnets per pole;
4 an optional squirrel cage; and
5 a stator with a winding selected from the group consisting of a Dahlander pole-
6 changing winding, a pole- amplitude modulated winding, and a pole- phase modulated winding
7 with toroidal coils.
- 1 10. A rotor, as set forth in claim 9, wherein said rotor has a plurality of poles.

1 11. A rotor, as set forth in claim 9, wherein said permanent magnets have rectangular shapes.

1 12. A rotor, as set forth in claim 9, wherein said permanent magnets are predominantly
2 tangentially magnetized.

1 13. A synchronous machine with a rotor comprising:

2 one or more iron core segments per pole;

3 one or more permanent magnets per pole;

4 an optional squirrel cage; and

5 a stator with a winding selected from the group consisting of a Dahlander pole-
6 changing winding, a pole- amplitude modulated winding, and a pole- phase modulated winding
7 with toroidal coils.

1 14. A rotor, as set forth in claim 13, wherein said rotor has a plurality of poles.

1 15. A rotor, as set forth in claim 13, wherein said permanent magnets have trapezoidal
2 shapes.

1 16. A rotor, as set forth in claim 13, wherein said permanent magnets are predominantly
2 tangentially magnetized.

1 17. A rotor of a synchronous machine, comprising:

2 one iron core segment per pole;

3 one tangentially magnetized permanent magnet per pole; and

4 one or more coils per pole.

1 18. A rotor, as set forth in claim 17, wherein said rotor has a plurality of poles.

1 19. A rotor, as set forth in claim 17, wherein said permanent magnets are tangentially
2 magnetized.

1 20. A rotor, as set forth in claim 17, wherein said coils can be separately excited.

- 1 21. A rotor of a synchronous machine, comprising:
2 one iron core segment per pole;
3 one tangentially magnetized permanent magnet per pole;
4 one radially magnetized permanent magnet per pole; and
5 one or more coils per pole.
- 1 22. A rotor, as set forth in claim 21, wherein said rotor has a plurality of poles.
- 1 23. A rotor, as set forth in claim 22, wherein said coils can be excited separately from each
2 other.
- 1 24. A rotor of a synchronous machine, comprising:
2 two iron core segments per pole; and
3 two tangentially magnetized permanent magnets per pole.
- 1 25. A rotor, as set forth in claim 24, wherein said rotor has a plurality of poles.

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